What is claimed is:

1. An NMR imaging process, comprising:

subjecting the imaging object to a uniform polarizing magnetic field;

applying orthogonal magnetic field gradients to the imaging object;

applying RF energy to the imaging object according to a fast-spin echo technique; and

subsequently applying RF energy to the imaging object according to a driven equilibrium technique.

2. The process of claim 1, further comprising:

detecting a nuclear magnetic resonance signal emitted by the imaging object; and

processing the nuclear magnetic resonance signal to provide imaging data.

3. The process of claim 1, wherein the fast-spin echo technique includes application of a multi-echo NMR imaging sequence.

4. The process of claim 3, wherein the multi-echo NMR imaging sequence includes a plurality of different echoes, and wherein each of the plurality of different echoes is encoded differently.

5. The process of claim 3, wherein the multi-echo NMR imaging sequence includes a plurality of different echoes, and wherein at least one of the plurality of different echoes is encoded differently than another one of the plurality of different echoes.

6. The process of claim 3, further comprising applying a 90-degree RF pulse at the center of any of the plurality of different echoes.

7. The process of claim 6, wherein the applied 90-degree RF pulse has a phase such that magnetization of the imaging object is forced in the direction of the uniform polarizing magnetic field.

8. The process of claim 3, wherein the multi-echo NMR imaging sequence includes a first 90-degree RF pulse followed by a series of 180-degree RF pulses.

9. The process of claim 8, wherein the series of 180-degree RF pulses includes *n* 180-degree pulses, which are followed by *n* echoes.

10. The process of claim 9, further comprising applying a second 90-degree RF pulse at a center of the *nth* echo, such that magnetization of the imaging object is oriented in the direction of the uniform polarizing magnetic field.

11. An NMR imaging process, comprising:

subjecting the imaging object to a uniform polarizing magnetic field;

applying orthogonal magnetic field gradients to the imaging object;

applying a first 90-degree RF excitation pulse;

applying a sequence of 180-degree RF excitation pulses following the first 90-degree RF excitation pulse; and

applying a second 90-degree RF excitation pulse following the sequence of 180-degree RF excitation pulses.

12. The process of claim 11, further comprising:

detecting a nuclear magnetic resonance signal emitted by the imaging object; and

processing the nuclear magnetic resonance signal to provide imaging data.

13. The process of claim 11, wherein each said 180-degree RF excitation pulse in the sequence generates a spin echo.

14. The process of claim 13, wherein each said spin echo precedes a next 180-degree RF excitation pulse in the sequence.

15. The process of claim 13, wherein the second 90-degree RF excitation pulse is applied at a center of the spin echo generated by a last 180-degree RF excitation pulse in the sequence.

16. The process of claim 13, wherein each said spin echo is encoded differently.

17. The process of claim 13, wherein at least one said spin echo is encoded differently than another said spin echo.

18. The process of claim 11, wherein the second 90-degree RF excitation pulse has a phase such that magnetization of the imaging object is forced in the direction of the uniform polarizing magnetic field.